

will determine the size and location of the piles of stacked material.

The Contractor's responsibility will cease upon final acceptance of the work, or 60 days from the time a certified notice (with copy to Engineer) is sent by Contractor to owner of material that all material is available for removal.

COMPENSATION

630.80 Method of Measurement.

The measurement of Highway Guard Removed and Reset will be made in its final position from center to center of end post to which the guard is attached, along the top edge of rail element. Any remaining Highway Guard not required to be stacked shall become the property of the Contractor and shall be removed from the work without additional compensation.

Highway Guard Removed and Stacked will be measured in its original position and the quantity to be paid for will be the length actually removed and stacked. Measurement will be from center to center of end posts to which guard is attached, along the scale or the top edge of rail elements.

630.81 Basis of Payment.

Removing and resetting highway guard will be paid for at the contract unit price per meter of Highway Guard Removed and Reset, complete in its final position.

New posts will be paid for at the contract unit price each for New Posts in Highway Guard Removed and Reset in addition to the payment for Highway Guard Removed and Reset.

Removing and resetting individual posts will be paid for at the contract unit price each for Individual Posts Removed and Reset, complete in place.

Removing and stacking of highway guard will be paid for at the contract unit price per meter of Highway Guard Removed and Stacked.

Removing and stacking of anchors will be paid for at the contract unit price each for Anchors Removed and Stacked.

Removing and stacking individual posts will be paid for at the contract unit price each for Individual Posts Removed and Stacked, except when such posts are included in payment for Anchors Removed and Stacked.

Rock excavation, if necessary, will be paid for at the contract unit price per cubic meter under the item for Class B Rock Excavation.

630.82 Payment Items.

630.* Highway Guard Removed and Reset	Meter
632. Individual Post Removed and Reset	Each
633. New Post in Highway Guard Removed and Reset	Each
635. Highway Guard Removed and Stacked	Meter
636. Anchor Removed and Stacked	Each
637. Individual Post Removed and Stacked	Each
144. Class B Rock Excavation	Cubic Meter

*Where more than one type of highway guard or post removed and reset is included in the Contract, a number will be added to the right of the decimal to distinguish between the different types.

SECTION 644

CHAIN LINK FENCE AND GATES

DESCRIPTION

644.20 General.

This work shall consist of the construction of chain link fence and gates in accordance with these specifications, and in close conformity with the lines and grades shown on the plan or established by the Engineer.

Chain link fence shall be either zinc coated steel, aluminum coated steel or vinyl coated steel.

MATERIALS**644.40 General.**

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Chain Link Fences and Gates	M8.09.0
Bonded Vinyl Coated Chain Link Fences, Posts, Rails, Fabric, Gates and Accessories	M8.09.2
30 MPa - 40 mm - 335 kg Cement Concrete Bases	M4.02.00
Paint, High Zinc Dust Content – Galvanizing Repair	M7.04.11

CONSTRUCTION METHODS**644.60 General.**

The posts shall be set true to the line and grade of the proposed fence.

End, Corner and Intermediate Brace Posts shall be set in concrete bases as shown in the Construction Standards.

The posts in masonry walls shall be set in pipe sleeves or sockets.

All line posts, except those which are unstable due to soil conditions as described hereinafter, shall have drive anchor assemblies as shown in the Construction Standards.

Line Posts, which in the opinion of the Engineer are unstable due to soil condition, (such as in swamps or seasonal wet areas) shall be placed in a concrete base as shown in the Construction Standards.

Where solid rock is encountered without an overburden of soil, line posts shall be set a minimum depth of 200 millimeters, and end, corner, gate and intermediate posts a minimum of 300 millimeters in the solid rock. The hole shall have a minimum width or diameter of 25 millimeters greater than the largest dimension of the post section to be set. The posts shall be cut, before installation to lengths which will give the required length of post above ground, or if the Contractor so elects he/she may use an even length of post above ground, or if the Contractor so elects he/she may use an even length of post set at greater depth into the solid rock.

After the post is set and plumbed the hole shall be filled with grout consisting of one part Portland cement and one part clean, well graded sand. The grout shall be thoroughly worked into the hole so as to leave no voids. Where posts are set in the above manner, concrete footings will not be required.

Where solid rock is covered by an overburden of soil or loose rock, the posts shall be set to the full depth shown on the standard drawing unless the penetration into solid rock reaches the minimum depths specified above, in which case the depth of penetration may be terminated. Concrete footings shall be constructed from the solid rock to the top of the ground as designated. Grouting will be required on the portion of the posts in solid rock.

Intermediate Brace Posts as used in these specifications, shall be spaced at 150 meter maximum intervals.

Gate, end, corner, and intermediate brace posts shall be braced as shown on the standard drawing. Changes in line of 30 degrees or more shall be considered as corners.

644.61 Foundation Bases.

Forms for placing concrete bases will not be required. Chamfer or bevel edges will not be required.

Where chain link fences are used to enclose Engineer's field office and material buildings, the posts shall be set in ground without concrete bases to facilitate ease in removal later.

644.62 Top Rail.

Top rail shall pass through the ornamental tops of line posts, forming a continuous brace from end to end of each stretch of fence. Lengths of top rail shall be jointed by sleeve type couplings. Top rails shall be securely fastened to terminal posts by pressed steel fittings.

On curves with a radius of less than 150 meters the top rail shall be bent true to the curve.

644.63 Top Tension Cable.

Top tension cable shall pass through the ornamental top of the line posts. One continuous length of cable shall be used between pull posts. The cable shall pass through the pull post top and down to the base of the next line post where it shall be attached to the base of the line post with a turnbuckle. Sufficient tension shall be applied to the cable to allow a maximum sag of 5 millimeters between posts after the chain link mesh has been attached to the cable. The Contractor shall provide temporary bracing on intermediate brace posts when applying tension to one length of cable at a time, to prevent undue stresses in the intermediate brace post.

After tension has been applied to the cables, a wire rope clip shall be placed around both cables one on each side of the intermediate brace posts, and the clips securely tightened. Clips shall be placed as close to the posts as possible to minimize the deflection of the post if one of the cables should be parted.

The cable shall be fastened to the top of the end intermediate brace post with an eye bolt through the post and a turn-buckle connecting the eye bolt to the cable. The end intermediate post shall be braced to the bottom of the end post with a short length of cable attached. A length of cable shall connect the end intermediate brace post and the end post at the top.

Eye bolts shall have a shoulder on the eye end and shall be provided with a nut and lock washer. Where the eye bolt is to be installed through a pipe section, 2 lead washers shall be placed against the shoulder of the eye, and a lead washer backed and the nut tightened sufficiently to seal the hole in the pipe.

A galvanized iron strap 6 millimeters in thickness by 50 millimeters in width, formed as shown on the standard drawing, shall be provided for the attachment of eye bolts to the base of "H" column post in order to take the strain of the cable tension off the web of the "H" column.

All holes drilled in steel post sections shall be cleaned and painted before the eye bolts are installed with 2 coats of paint, High Zinc Dust Content – Galvanizing Repair (M7.04.11).

The ends of all cables shall be seized with annealed iron wire passed around the end of cable and the line cable. The seizing shall be at least 25 millimeters in width.

644.64 Spring Tension Wire.

Spring tension wires shall be placed 250 millimeters from the top and bottom of the line posts, corner posts, end posts and intermediate brace posts. The spring tension wire shall be fastened to each line post with a No. 6 gauge steel clip.

The wires shall be fastened to end posts, corner posts and intermediate brace posts with an end band and a minimum of five (5) turns around the spring tension wire to end the installation. One continuous length of spring tension wire shall be used between intermediate brace posts (150 meters).

Sufficient tension shall be applied to create a tension in the spring tension wire so that no sag is visible. On completion of the installation the spring tension wire shall be attached to the fence fabric with hog rings of No. 11 gauge placed every 300 millimeters \pm top and bottom.

644.65 Fence Fabric.

Chain link fabric over 1.5 meter fence shall be placed on the face of the post away from the highway, and for fence 1.5 meters or less, erect fabric on the face of the posts designated by the Engineer, except that on curves the fabric on all types of fence shall be placed on the face of the post which is on the outside of the curve.

The chain link fabric shall be placed approximately 50 millimeters above the ground and on a straight grade between posts.

The fabric shall be stretched taut and securely fastened to the posts. Stretching by motor vehicle will not be permitted. Fastening to end, gate, corner, and intermediate brace posts shall be with stretcher bars and fabric bands spaced

at 300 millimeter intervals. The fabric shall be cut and each span attached independently at all intermediate brace and corner posts. Fastening to post, top rail, top tension cable or spring tension wire shall be with wire, metal bands, hog rings, or by other approved method.

Rolls of wire fabric shall be joined by weaving a single strand into the ends of the rolls to form a continuous mesh.

644.66 Gates.

Chain link fabric shall be fastened to the end bars of the gate frame by stretcher bars and fabric bands, and to the top and bottom bars of the gate frames by tie wires in the same manner as specified for the chain link fence fabric; or by other standard methods if approved by the Engineer.

The height of the gate frame shall be approximately as follows:

	Fence Height (meters)	Gate Height (meters)
	1.0	0.85
1.25	1.1	
	1.5	1.35
	2.0	1.85

COMPENSATION

644.80 Method of Measurement.

Chain link fence will be measured, approximately parallel to the ground by the meter of completed fence, exclusive of openings from outside of to outside of end posts.

Gates with gate posts will be measured between centers of the gate posts.

644.81 Basis of Payment.

Chain Link Fence will be paid for at the contract unit price per meter, complete in place, except for rock excavation, which shall include all drive anchors, line posts, fabric, top rail, cable or wire, fasteners, clips and all materials and equipment necessary to complete the work in a satisfactory manner. Allowance for rock excavation will be as specified under Class B Rock Excavation.

Gates with Gate Posts will be paid for at the contract unit price per meter of the height specified and the respective widths shown on the plans complete in place. Allowance for rock excavation will be made as specified under Class B Rock Excavation.

End post including brace will be paid for at the contract unit price each under item for Chain Link Fence End Post, complete in place. Corner and intermediate brace post will be paid for at the contract unit price each for Chain Link Fence Corner and Intermediate Brace Post, complete in place. The chain link fence fabric and posts shall be of the type used throughout the installation.

Concrete bases for line posts, if required, shall be paid for under Item 901.3, 30 MPa - 40 mm - 335 kg Cement Concrete Masonry for Post Foundation, which shall include the excavation, except rock excavation, which shall be paid under Class B Rock Excavation.

644.82 Payment Items.

644.1*	___ meter Chain Link Fence (Spring Tension Wire) (Fabric and Line Post - Option)	Meter
644.3	___ meter Chain Link Fence (Spring Tension Wire) Vinyl Coated (Line Post - Option)	Meter
645.1*	___ meter Chain Link Fence (Pipe Top Rail) (Fabric and Line Post - Option)	Meter

645.3	___ meter Chain Link Fence (Pipe Top Rail) Vinyl Coated – (Line Post - Option)	Meter
646.1*	___ meter Chain Link Fence (Cable Top) (Fabric and Line Post - Option)	Meter
646.3	___ meter Chain Link Fence (Cable Top) Vinyl Coated (Line Post - Option)	Meter
647.1*	___ meter Chain Link Fence (Pipe Top Rail) With Barbed Wire (Fabric and Line - Post Option)	Meter
648.1*	___ meter Chain Link Fence (Cable Top) With Barbed Wire (Fabric and Line Post - Option)	Meter
649.1*	___ meter Chain Link Fence (Spring Tension Wire) With Barbed Wire (Fabric and Line Post - Option)	Meter
650.1*	___ meter Chain Link Gate, With Gate Posts	Meter
651.1*	___ meter Chain Link Gate, With Gate Posts and Barbed Wire	Meter
652.*	___ meter Chain Link Fence End Post	Each
653.*	___ meter Chain Link Corner and Intermediate Brace Post	Each
654.*	___ meter Chain Link Fence Fabric	Meter
144.	Class B Rock Excavation	Cubic Meter
901.3	30 MPa - 40 mm - 335 kg Cement Concrete Masonry for Post Foundation	Cubic Meter

*Insert height of fence or gate at beginning of nomenclature.

When option is stipulated in above items the Contractor will be required to indicate his/her choice.

SECTION 660

METAL PIPE RAIL

DESCRIPTION

660.20 General.

This work shall consist of the construction of metal pipe rail in accordance with these specifications and in close conformity with the lines and grades shown on the plan or established by the Engineer.

MATERIALS

660.40 General.

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Rails and Posts	M8.10.0A
Fittings	M8.10.0B
Lead Wool	M8.10.0C
Bitumen	M8.10.0D
Paint (Primer Coat)	
Zinc Dust-Zinc Oxide	M7.04.07
Paint (Finish Coat)	
Enamel	M7.03.02

CONSTRUCTION METHODS

660.60 Fabrication and Erection.